

of a living organism is as yet interpretable in terms of the formulæ used by the chemist and the physicist. And we find nothing in this volume to shake this disbelief.

J. A. T.

### A PHILOSOPHER ON EVOLUTION.

*The Limits of Evolution.* By Prof. Howison. Pp. xxvii + 380. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1901.) Price 7s. 6d. net.

THE main argument of the book is clearly summarised in the preface. Nothing has any real existence except mind. There are a number of coexistent minds. All else is but the items of their experience, which they arrange in order for themselves. God is the "fulfilled type of every mind," an ideal to which it is trying to assimilate itself. These minds are citizens of an eternal republic. They have had no origin in time. They have not been created in the sense in which the word is ordinarily understood. They are free: "nothing but their own light and conviction determines their action towards each other and towards God." This freedom is made possible by the substitution of a final for an efficient cause. "Real creation means such an eternal dependence of other souls upon God that the non-existence of God would involve the non-existence of all souls." Evolution is the "movement of things changeable towards the goal of a common ideal," and spirits can "neither be the product of evolution nor in any way subject to evolution," which can only reign in "the incomplete and tentative world of experience."

The first and last essays elaborate the theory, insisting always on the freedom of the will. It is in order to prove that the will is free that our author has established his republic of independent minds. If the mind of an individual man is merely part of the force that permeates the whole universe, it can have no freedom. Pantheism, therefore, must be rejected. Creation, too, in the old sense must be given up; if created, the mind can have no independence. Hence the assumption that it has had no beginning and will have no end. Thus war is declared against the monistic philosophy, according to which body and mind are but different aspects of what is divisible only in thought, and the mind, therefore, as perishable as the body.

Prof. Howison fears that philosophy is tending towards determinism, and this tendency he considers fraught with the gravest danger. No doubt if a man puts his determinism into practice, and, when called upon to act, feels that he is a mere automaton set in motion by influences from without, he is not one who can fill any post where energy and determination are required. We must imagine that our wills are free or we are helpless. Whether we are really free is unimportant. The belief is strong in almost every man, at any rate in almost every European. Most men are content to leave the matter undiscussed, holding that they have a real freedom, however inexplicable and even unthinkable it may be. But Prof. Howison tries to find a philosophic explanation for the belief, and, interesting as his book is, we cannot think that he has been successful.

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Let us first consider his "republic of minds." They exist in a world the existence of which is "incomplete and tentative." Nothing but mind is really existent. We start, then, each of us with our own mind. And how do we become cognisant of the existence of other minds? This can only be through our bodily senses. Yet our bodies are not things really existent. Moreover, we cannot touch, see or hear other men's minds; we only infer their existence from their looking out upon us through their bodily eyes or speaking to us with their bodily vocal organs. Thus the existence of a real world of minds is accepted on the evidence that is obtained for us by mere phenomena. Next as to the free will that Prof. Howison has to offer us. If he reduced the whole universe to unreality except each man's own *ego*, then the mind would move *in vacuo*, not tyrannised over by any external influences. As he himself puts it, the condition of freedom for man is that "the world shall be a world of *phenomena*—states of his own conscious being, organised by his spontaneous conscious life—and not a world of 'things-in-themselves.'" But he does not make other minds mere phenomena.

Any individual mind must, therefore, be influenced from without by the other citizens of the republic of minds. No doubt even under these conditions there may be autonomy: the mind may decide *in accordance with its own character* which influence from without it will allow to prevail with it. The existence of other minds need not destroy autonomy in this sense. But free will, such as this, is quite consistent with the monism which Prof. Howison condemns. It is not the freedom in which the ordinary healthy man has at least a practical belief. He has the feeling that he can transcend his own nature, conquer his weaknesses and bad tendencies and develop other and better tendencies. It may be impossible to explain how he can have such a power. Certainly this book leaves us dependent on our instinctive feeling of freedom.

Next as to our author's view of evolution. Evolution, he insists, cannot explain the origin of life or the origin of mind. But no clear-headed evolutionist holds that evolution can originate. We must assume an underlying force which, through evolution, is variously manipulated and concentrated. As to the ultimate origin of the underlying force, evolution has nothing to say. This much we may concede. But Prof. Howison assumes that, not only mind, but *the individual mind* has existed from eternity, and in this he is unreasonable. The development of certain bodily organs proceeds *pari passu* with the development of mental power. We can trace the gradual evolution of nerve till it culminates in the human brain. We are bound to assume, then, that a particular mind is the product of evolution; like the body, it has been elaborated out of something that preceded evolution. This question is not fairly faced by Prof. Howison. In a footnote (p. 10) he allows that we can trace the upward steps of intellectual development, and there he leaves the matter, assuming as the basis of his dualistic philosophy that the mind of each individual has existed from eternity and has, apparently, been inserted extraneously in the body.

Some of the contradictions involved in his system our author sees and attempts to remove. If each individual

mind has an independent existence from eternity, monotheism seems to disappear. On the other hand, if monotheism is insisted on, what becomes of the free-willing, independent minds, the citizens of the republic of minds? We are expected somehow to accept what look like contradictory propositions simultaneously. Again, all minds are different from one another and yet all are straining towards the same ideal. Here is a sentence that aims at explaining this :—

"In fine, its self-definition (*i.e.* the self-definition of each spirit) is at the same stroke in terms of its own peculiarity, its own ineradicable and unrepeatable *particularity*, and of the supplemental individualities of a whole world of others—like it in this possession of indestructible difference, but also like it in self-supplementation by all the rest : and thus it intrinsically has *universality*" (p. 353).

We have left little space for the discussion of the essays that deal less directly with the main argument. One of them gives an interesting account of later German philosophy, another deals with the "art-principle in poetry." The essay on the "Right relation of reason to religion" is certainly the best. Everywhere in the book, but most of all in the last-mentioned essay, we feel that the author is a man who hates any notion that is in itself or in its implications degrading to human nature. In religion he boldly rejects authority and bases it on reason, defined as the mind's own insight, as its true source.

There is much in the book that it is good to read. The author hates pessimism ; most of all he hates determinism as a belief that unnerves the character and robs human life of what is best in it. But he has found no philosophic basis for his views. In fact, we have in this book an instance of what is not uncommon : a man's opinion is often of far greater value than all the reasons he is able to give for it.

### COAL MINING.

*A Text-Book of Coal-Mining.* By Herbert W. Hughes: 4th edition. Pp. 513 : 670 figures. (London : Griffin and Co., Ltd., 1901.) Price 24s. net.

MR. HUGHES and his publishers may fairly be congratulated on the success of a text-book which requires a new edition about once in every three years, and this, too, in spite of its high price, which is beyond the means of the average student. The new edition contains ninety more pages and 184 more illustrations than the first.

It can hardly be expected that a large treatise of this description should be free from some minor errors ; but when these are decidedly numerous, one cannot help feeling that there is want of care on the part of the author. Mr. Hughes seems to think (p. 3) that reversed faults are rare ; surely he can never have carefully looked at the sections of some of the Continental coal-fields. On p. 4, while speaking of the Carboniferous system in Scotland, he appears to be ignorant of the coal in the Calciferous Sandstone below the Carboniferous Limestone.

The chapter on boring is weak ; it may be said with a good show of truth that the colliery engineer nowadays frequently entrusts the work of boring to a contractor ;

but this is an argument for omitting the chapter altogether, rather than for treating the subject in a slovenly fashion. There is no figure of a derrick of any kind. On p. 22 it is stated that the American boring tool is rotated by hand ; this was done formerly, nowadays turning by hand has been given up. The rotatory and percussive systems of boring are mixed up in a manner puzzling to the student, for the description of the diamond drill says : "This method differs from the others in the fact that the tool receives a rotary instead of a percussive motion" ; and yet just above, on the very same page, Mr. Hughes has been describing Davis's calyx drill, which works by rotation.

Timbering is not treated so fully as one would like, and we scarcely think that Haselmann would be content to hear his process of preserving timber spoken of as similar to the Aitken process.

An author should be consistent. In speaking of the transmission of power (p. 46), it is said that the choice is limited to compressed air and electricity, and yet a little further on we have a description of Brandt's drill, which is driven by water.

Mr. Hughes is wrong in supposing that the "straw" cannot be employed for igniting charges of explosives other than gunpowder. He is a little behind the times with regard to water injection while boring, as he makes no mention of Bornet's system, which is an unquestionable improvement upon the method tried at Blanzky in 1889, and not 1899.

Granted that some knowledge of electricity on the part of the mining engineer is nowadays desirable, if not imperative, is it not better that he should obtain the rudiments of that knowledge first-hand from an electrician rather than second-hand from a miner? Why should the writer of a mining text-book think it his business to explain the electrical units? Mr. Hughes evidently expects the student to learn elsewhere what is meant by such terms as "limestone," "sandstone," "horse-power," "symbol," "molecular weight" ; why then does he go out of his way in the case of electricity, upon which subject there is ample published information? As a consequence, we find the mistake of defining the ampere as "the quantity per minute."

In the same way, it would be better to leave the question of generation of power to an expert. Steam-boilers are mentioned in a somewhat cursory fashion, and all other modes of generating power ignored. One of the statutory fittings to the boiler, viz. the safety valve, is described, but the other two, the water gauge and the steam pressure gauge, are not noticed.

On page 432, Mr. Hughes revives the old question whether the introduction of safety lamps will not produce an increase in the number of deaths from falls of roof and side. Statistics have shown that this fear is unfounded, and it is a pity to throw doubts upon the subject.

While calling attention to the existence of very numerous minor defects, one cannot be blind to the useful work which Mr. Hughes has done in compiling what is unquestionably the best text-book on coal-mining in the English language, and for keeping it up to date. For this he well deserves the thanks of students and mining engineers. Plate II., reproduced from Mr. Hughes' own photographs, is excellent.